

Each of the companies involved in hydrogen station development uses different equipment and technology and, therefore, will have different specifics. Below is a list of questions station owners and operators frequently ask, and the answers that are common across hydrogen technology platforms. Also listed are questions for you to ask the equipment provider directly.



## What training is needed to operate a dispenser?

Hydrogen dispensers are designed for unattended operation. Customers receive fueling training at the dealership when they pick up their vehicles. They know how to fill with a gaseous fuel. Your station developer will provide your employees with training and the California Fuel Cell Partnership has additional resources available.

## How is fuel distributed?

If you are having fuel delivered (as opposed to making it on site), you will have one hydrogen provider that negotiates an annual contract and arranges a delivery schedule. The cost of hydrogen is quite stable and doesn't have the same fluctuations as gasoline and diesel.

**Gaseous hydrogen** is delivered by swapping storage trailers. Storage tubes are permanently mounted on the trailer. The driver opens the gate around the storage area, backs in a full trailer and connects it to the dispensing system. The driver then disconnects the empty tube trailer, hooks it to the tractor and drives away. Swapping trailers can take between 10 and 30 minutes.

**Liquid hydrogen** is delivered by a tanker truck that looks quite similar to a gasoline tanker. The driver connects the hose from the truck to a valve on the storage tank and offloads liquid hydrogen. Because liquid hydrogen is at a cryogenic temperature, a vapor cloud often forms around the transfer point. Filling the storage tank typically takes around 30 minutes, depending on the size of the tank.

## Questions to ask the station provider:

- Who performs station maintenance?
- If something breaks, how quickly does the service tech arrive?
- How does it impact my insurance?



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## Can the hydrogen storage tanks be placed underground?

Current hydrogen fueling equipment technology allows for above ground fuel storage only. Codes and standards organizations are looking at below-ground storage, but that will be some time in the future.

## How are the dispensers the same or different from gasoline dispensers?

Like a gasoline dispenser, a hydrogen dispenser typically has two sides, each with a similar interface. The dispensers are designed to accept credit cards and display sales information in accordance with state Weights and Measures requirements. Volume is displayed in kilograms (kg).

**A dispenser has two hoses:** one for H35 (5,000 psi) and one for H70 (10,000 psi). The nozzles on each hose are different and an H70 nozzle will not fit on to the receptacle of an H35 car; neither nozzle will fit a CNG vehicle. The nozzle locks onto the car's receptacle, the same way that natural gas vehicles fuel or you fill propane tank. Once the seal is tight and the customer has activated the dispenser, fuel flows into the car's tank. When the tank is full the dispenser turns off. Because hydrogen fueling is a gaseous, closed-loop system, nothing drips or spills.

## What companies supply hydrogen fueling equipment? Are they the companies we already do business with? How many suppliers are out there?

Most of the companies providing equipment for hydrogen stations have a background in the industrial use of hydrogen rather than in retail sales. Many components are sourced from suppliers who are in the conventional fuel business. Components and equipment are, however, designed specifically for hydrogen.

## What are the safety systems?

A hydrogen station has several different safety systems that work together. If flame detectors or gas sensors detect a fire or leak, safety measures turn on automatically, such as sealing the storage tanks, stopping hydrogen flow or—in the case of an extreme fire—safely venting the hydrogen. Strategically placed emergency stops will manually shut down hydrogen equipment. Retaining walls, equipment setbacks and bolsters are designed into the site plan to maximize safety.

## Can the equipment go under the canopy?

It can physically go under the canopy, but ability to put it under the canopy is up to guidelines of the station brand. Some of the existing stations have hydrogen dispensers on the same island as other dispensers. At other stations the hydrogen dispenser is on its own island either under the canopy, just outside of canopy or on a separate section of property.

### Questions to ask the station provider:

- What piece of equipment limits capacity? How can I later increase capacity without replacing the most expensive pieces or tearing up the concrete again?
- What are the maintenance issues? Which piece is most likely to fail or need servicing? What drives maintenance costs up or down?
- Is it better to have more storage or swap out the tanks more frequently?
- What are the expected technology advances?



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